

Research Problem Review 79-7

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# AN EVALUATION OF A TECHNIQUE FOR USING THE COMBAT TRAINING THEATER (CTT) FOR PERIODIC RIFLE MARKSMANSHIP PROFICIENCY TRAINING AND QUALIFICATION

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U. S. Army

Research Institute for the Behavioral and Social Sciences

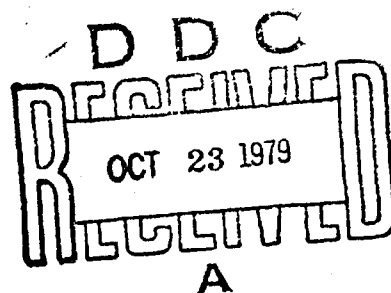
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COMBAT TRAINING THEATER (CTT) FOR PERIODIC RIFLE  
MARKSMANSHIP PROFICIENCY TRAINING AND QUALIFICATION,

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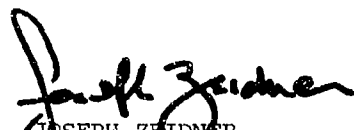
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## FOREWORD

Research in the area of field validation of training concepts and devices targeted for U.S. Army, Europe (USAREUR) utilization is conducted as an in-house effort by the Army Research Institute for the Behavioral and Social Sciences (ARI). The entire project is directly responsive to the Army's advanced development RDTE program and to special requirements of the 7th Army Training Center at Grafenwoehr, Germany. The present effort, accomplished under Army Project 2Q163743A773, represents one phase in the exploration of newly developed training concepts, devices, aids and simulation techniques that are not yet field tested. The objective of this effort is to conduct validation studies of selected devices, techniques, and concepts and provide for their integration into USAREUR programs as their training value is documented.

The authors wish to acknowledge the dedicated and substantial assistance that SSG Ronald J. Anderson of the 1st ID provided during the equipment setup and data collection phase of the study. They also extend appreciation to CPT George S. Perkins of the 4th Brigade, 4th ID, and CPT Richard E. Overmyer, Jr., of the 7th ATC, Combined Arms Training Directorate, for their contributions to the scheduling and execution of this effort.

  
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AN EVALUATION OF A TECHNIQUE FOR USING THE COMBAT TRAINING THEATER  
(CTT) FOR PERIODIC RIFLE MARKSMANSHIP PROFICIENCY TRAINING AND  
QUALIFICATION

BRIEF

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Requirement:

To evaluate an indoor Combat Training Theater (CTT) record fire simulation for the M16A1 rifle as an alternative to actual record firing on an outdoor range for proficiency maintenance and skill qualification.

Procedure:

Participants were 104 infantry riflemen who were assigned to two different groups and served as their own controls. Each participant fired a standard qualification schedule of two phases (practice record fire and record fire) in the CTT and also at a standard outdoor trainfire range facility. For the CTT part of the test, 35mm color slides of typical E-type target presentations were projected on a paper screen to simulate the trainfire range, and soldiers fired a .22 caliber rimfire adapter (RFA). Firing was conducted at each facility in the context of normal qualification requirements employed under Record Fire I conditions.

The indoor CTT range qualification was expected to closely approximate performance on the standard outdoor record fire range.

Four paper-and-pencil tests were also administered in an attempt to find measures useful in predicting success and failure of rifle marksmen.

Findings:

Although hit probability scores in the CTT were lower than scores from the standard outdoor range, they were similar in slope to scores obtained earlier at the Army Training Center, Fort Jackson, S.C. That is, the relative difficulty of hitting targets at different distances is effectively the same in the CTT as it was at Fort Jackson. CTT performance was in general more internally consistent and better controlled and required fewer resources than did the outdoor range firing. Correlation between the practice record fire scores and record fire scores ...

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was substantially higher in the CTT than on the outdoor range. However, the correlation between CTT and the outdoor range scores was not significant; this was probably due to the unreliability of the outdoor range scores.

Scores on the paper-and-pencil tests did not correlate well enough with marksmanship scores to be useful as predictors of performance.

#### Utilization of Findings:

The CTT appears to offer a high potential for cost-effective maintenance of rifle marksmanship skills. Field commanders can use the CTT as an alternative training technique to minimize the ammunition, travel, and billeting costs associated with current rifle marksmanship training practices. Nevertheless, only tentative support can be given to using the CTT to conduct annual basic rifle marksmanship (BRM) qualification. Further testing is needed to determine the feasibility of directly substituting the CTT for the outdoor range in BRM qualification. Instead, the CTT should serve at present as a supplement to outdoor firing until the hardware problems associated with the RFA have been resolved.

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AN EVALUATION OF A TECHNIQUE FOR USING THE COMBAT TRAINING THEATER (CTT)  
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AN EVALUATION OF A TECHNIQUE FOR USING THE  
COMBAT TRAINING THEATER (CTT) FOR PERIODIC RIFLE  
MARKSMANSHIP PROFICIENCY TRAINING AND QUALIFICATION

INTRODUCTION

Background

To demonstrate rifle proficiency, most Army personnel must shoot to the same standards required of entry-level soldiers by requalifying every year on a trainfire range. Although all Army recruits receive basic rifle marksmanship (BRM) training on the M16A1 rifle early in their military careers, this training represents the primary, and in some cases the only, small arms and weapons training of this type received in the Army. Beyond this, little prescribed training is conducted for the maintenance (or improvement) of marksmanship skills. In some units no formalized schedule of proficiency training is carried out to prepare for annual record fire qualification. Instead, the process of qualification itself is often regarded as training. In these instances more emphasis is placed upon qualification than on providing feedback of marksmanship skills to riflemen. It would be unfortunate indeed if field units were to use record fire scores solely to satisfy the requirement for periodic qualification of their individual soldiers, rather than as a means for evaluating the need to provide appropriate remedial training.

Despite the scarcity of certified outdoor facilities in USAREUR capable of satisfying record fire requirements, field commanders must satisfy a number of marksmanship-related training requirements in addition to annual record fire qualification, including the Army Training and Evaluation Program (ARTEP) and Skill Qualification Tests (SQT). At present, outdoor trainfire ranges located at Major Training Areas (MTAs) within U.S. Army, Europe (USAREUR) (such as those at Wildflecken, Baumholder, and Hohenfels) are used in an attempt to satisfy these requirements. Such requirements, however, place time and cost burdens on commanders because of the need to billet and transport troops to the few remote record fire facilities in Europe. The most frequent criticism of the several record fire ranges in use concerns their inoperability due to constraints imposed by the weather and the M31A1 pop-up target-holding mechanisms. Also, uncontrolled vegetation overgrowth makes certain range targets difficult to see. Consequently, quality control in terms of feedback to the firer is often hampered. There is no systematic procedure for diagnosing errors and providing immediate feedback to the firer so that errors can be corrected. It is most helpful to firers to be able to sense where their shots strike, so that they can make the necessary corrections to the point of aim.

The standard record fire range achieves realism by presenting the firer with various target situations likely to be encountered in combat. The ultimate criterion for rifle marksmanship is, of course, combat effectiveness. Obviously the criterion for annual qualification must be a more plausible measure of performance, but one that allows a representative array of rifle marksmanship skills to come into play. The Record Fire I exercise described in the U.S. Army Infantry School (USAIS) Rifle Marksmanship Training Program of Instruction (POI) (USAIS, 1977) is currently used as that criterion. This exercise requires the rifleman to detect, engage, and hit pop-up target silhouettes at ranges from 50 to 300 m. Both single and multiple targets must be engaged from specified firing positions within 5 to 20 seconds. The only relative movement between the firer and the target is the sudden appearance of the pop-up target.

It is highly unlikely that a unit that conducts only the minimum amount of rifle marksmanship training (i.e., one record fire annually) for its 11B personnel will be able to sustain proficiency at the level required for this Military Occupational Specialty (MOS). If unit commanders are to keep 11B marksmanship skills up to standard, then some kind of proficiency training program must be implemented. The inaccessibility and lack of adequate range facilities is a major deterrent to this type of training.

The indoor Combat Training Theater (CTT) provides a potential solution to some of these problems. The CTT is primarily designed to permit record fire training and evaluation to be done locally at installations with high troop density, where record firing has never before been possible. Ten USAREUR locations have operational CTTs. The recent POI published by USAIS plans to take maximum advantage of new technology. However, although CTTs can potentially support existing BRM requirements, and some units do train in the CTT, the effectiveness of a formalized program of training has not yet been systematically evaluated.

### Objective

The present research was designed to assess whether the indoor CTT can serve as an alternate means for satisfying USAREUR rifle marksmanship qualification and training needs. The immediate objective was to evaluate a specific training technique in the CTT for this purpose, identify its shortcomings, and determine its potential for maintaining rifle marksmanship proficiency.

A secondary objective was to determine whether selected paper-and-pencil performance tests, which measure perceptual motor skills, could be used in making differential predictions about the success and failure of rifle marksmen. If relationships between predictor test variables and criterion performance in marksmanship qualification could be demonstrated, then it would be possible to know in advance which soldiers are

most likely to become successful marksmen. Commanders would then be able to assign the best prospects for rifle marksman to specialized programs early in training.

A questionnaire was also designed for this evaluation to (a) collect background information on test participants, (b) determine attitudes toward previous BRM training, and (c) assess attitudes concerning qualification relative to the indoor and outdoor range experience.

The research design involved a comparison between the effects of two different record fire facilities on the terminal performance (i.e., qualification scores) of riflemen participating in the evaluation. The performance scores of two experimental test groups were to be compared with respect to independent group correlations achieved between firings at each of the two facilities. Participants from each experimental test group were required to detect and successfully engage silhouette targets in accordance with the BRM record fire qualification POI developed by the USAIS at Fort Benning, Ga. The criteria for comparison of relative performance were to be firer scores on a practice test and a qualification test at each range facility. The hypothesis tested was that the CTT range results would approximate those achieved on an actual outdoor record fire range.

#### METHOD

##### Participants

The sample population consisted of 104 infantry riflemen drawn from two battalions within the 4th Brigade ("Brigade 76"), 4th Infantry Division, stationed at Wiesbaden, Federal Republic of Germany (FRG). All participants had completed BRM and Advanced Individual Training (AIT) prior to arrival in the FRG and had received an official record fire rating within the past year.

Test participants were scheduled to fire in the CTT and on the Wildflecken outdoor record fire range in two groups. Group X<sub>1</sub> consisted of 51 members of Company C, 2d Battalion, 22d Infantry. Group X<sub>2</sub> consisted of 53 members of Companies A and B, 3d Battalion, 28th Infantry (part of the 1st Infantry Division attached to Brigade 76).

The population sample was represented by the following MOS: 82% were 11Bs; 12%, 11Cs; 3%, 63Cs; 2%, 63Bs; and 1%, 63Fs. The average age of participants was 20.5 years, of which 2.36 years had been spent in the Army. Tests showed that 80% of the participants had 20/20 vision or better in their aiming eyes. Appendix D gives more detailed information on the background characteristics of the test population; see responses to items 1 through 9 of the BRM questionnaire.

## Facilities and Equipment

Combat Training Theater (CTT). The CTT is a multipurpose, indoor firing range that combines projection devices (slide and motion picture), a moving paper screen, and a specially controlled lighting system to create a variety of ambient conditions in the theater. A hand-held, remote control unit programs the projectors for the type of target required. An electrical switch panel controls lighting conditions from full light to total darkness (or infrared lighting) for training with night devices. Targets are projected on the screen and can be engaged by individual firers (riflemen) or total weapon systems (tanks). The rear impact wall determines the type of ammunition that can be used. Existing facilities at the CTT in Wiesbaden limit firing to .22 caliber projectiles. Other CTTs can accommodate up to .45 caliber weapons, depending upon the strength of the rear impact wall. Floodlights behind the screen illuminate the hole made by the bullet as it passes through the screen. The firer and grader should then be able to immediately assess the accuracy of the round. After each firing the paper screen is slightly advanced on its rollers and rotated back on itself, thereby eliminating the light source and appearance of the hole.

For this evaluation, the existing slide projection system in the CTT was modified to include four (rather than two) synchronized 35mm slide projectors. A special remote-control adapter box was designed to synchronize the cycling of manual and timed target control for each set of projectors. Additionally, two sets of 35mm color transparencies were specially prepared to simulate a typical firing lane on an outdoor record fire range. Each set contained a series of E-type silhouette targets from 50 to 300 m in range that were scaled to appear at the appropriate visual angle when viewed by the firer. These targets effectively simulated those that a firer might be expected to engage on an outdoor trainfire range.

A rimfire adapter (RFA) was substituted for the standard M16A1 bolt carrier group, which permitted firing of a commercial standard velocity .22 caliber round with the M16A1 rifle. Up to 10 .22 caliber rounds can be loaded into a special magazine for use with the M16. With the RFA the rifle can be made to fire as it would with the service ammunition. The subcaliber ammunition, commercially available for less than 2 cents a round, provides a substantial savings over the standard 5.56 ball ammunition costing approximately 8½ cents a pound. When fired within 50 m, the performance of the cheaper subcaliber round is ballistically similar to the service round (Woodruff, et al., 1977).

Two firing lanes, each consisting of one firing point 25 m from the firer's station to the screen, were used in the CTT. The paper screen at the far end of each lane was illuminated by two sets of two ceiling-mounted Kodak slide projectors. One projector in each set displayed a "background" slide containing an artist's rendering of an outdoor record fire lane, and the other projector in each set displayed the same rendering with the appropriate target(s) added as required by

the record fire qualification sequence used. Each set of two projectors alternated these images, creating the visual impression of targets "popping" into view against a constant background of foliage and other vegetation. Identical targets were presented simultaneously in each lane, and the projectors containing the target slides were automatically sequenced so that a different target presentation appeared each time. Figure 1 is an artist's rendering of a single lane with an E-type target at 150 m in the center foreground. Figure 2 represents the firing range layout and depicts simultaneous presentations of targets on the two lanes within the CTT.

Wildflecken Trainfire Facility. The outdoor trainfire range at Wildflecken is designed to provide 12 firing points with targets at 50, 100, 150, 200, 250, and 300 m. The targets are electronically raised from the control tower on the range by an M31A1 target-holding mechanism. Once activated, the M31A1 is designed to be deactivated by the impact of a bullet striking the target. This causes a target to fall, and a hit is recorded on the scorecard for the firer when it occurs. Targets can also be electronically lowered from the control tower. Targets in use at Wildflecken are all full silhouette, E-type (head and torso) targets.

Visibility was excellent on the Wildflecken firing range during the 2 days allocated for testing at that site, but heavy vegetation overgrowth partially obscured several targets. In addition, only 5 of the 12 available lanes were fully operational, and 2 others were partially operational because of the failure of one or more of the M31A1 pop-up mechanisms in the firing lanes. Because of scheduling considerations, it was also necessary to conduct the Wildflecken firing on a weekend, which added a motivation problem to that portion of the program.

#### Research Design

The record fire criterion exercise, administered in accordance with FM 23-9, Chapter 5, was used to compare marksmanship performance resulting from the fire at each of the two test facilities. The firing tables used in this evaluation were taken from the U.S. Army Infantry Board (USAIB) M16A1 marksmanship POI dated April 1977. Appendixes A and B show the practice record fire (PRF) and record fire (RF) sequences used, respectively.

The research design involved a comparison between the scores of each experimental treatment group with respect to how well its performance scores correlated at each of the facilities involved. The experimental groups  $X_1$  and  $X_2$ , which served as their own controls, required each man (after zeroing his weapon) to fire 80 rounds (40 rounds PRF and 40 round RF) at each location. Table 1 shows experimental paradigm and sequence in which the firing took place for each treatment group.



Figure 1. E-type target at 150 meters.



Figure 2. Representation of firing range layout within the CTT.

Table 1

## Experimental Paradigm

Treatment group	CTT		Enroute	Wildflecken		Enroute	CTT	
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Group X <sub>1</sub>	PRF RF		Travel	PRF	RF	Travel	---	
Group X <sub>2</sub>	---		Travel	PRF	RF	Travel	PRF RF	

Note: PRF = practice record fire.  
RF = record fire.

A questionnaire was developed to gain information on participants' previous experience, confidence in marksmanship ability, and preferences regarding qualification, and also to identify shortcomings in current training. Background data on test participants were collected to insure that test results (firing performances) were not biased by treatment group differences. Performance variables also to be assessed were those that could be attributed to differences between test groups (e.g., visual acuity scores or scores that may have been influenced by firing first in the CTT, rather than by firing in the CTT after exposure to the outdoor range).

The criteria for comparison of relative performance were test scores on the PRF and RF sequence obtained at each facility. Major performance variables were overall hit probability, hit probability by target range, and reliability of performance. Overall hit probability was measured by the total number of target hits divided by the total number of targets exposed. The probability of hit by target range was computed by dividing the total number of target hits at a given range by the total number of targets exposed at that range.

Four paper-and-pencil performance tests were administered to participants as potential predictors of marksmanship performance. These tests tapped various perceptual and motor skills, primarily involving speed of reaction, visual recognition, and gross eye/hand coordination. These tests were the Army Perceptual Speed Test, Speed of Perception Test, the Attention-to-Detail Test, and the Visual Memory Test (see Appendix C for examples).

## Procedure

All 104 participants fired both in the CTT and on the outdoor trainfire range at Wildflecken. To counterbalance any training effects, treatment Group X<sub>1</sub> participants fired first in the CTT and then at Wildflecken; treatment Group X<sub>2</sub> participants fired first at Wildflecken and then in the CTT. Questionnaires, a visual acuity test, and predictor tests were given in the CTT by a team of trained administrators, who used a standardized set of instructions.

Upon entering the CTT, participants received a safety briefing and instructions on how to use the RFA. While waiting their turns to fire, participants were administered the four predictor tests, received a visual acuity test, and completed questions 1 through 25 of the questionnaire. After firing, participants returned to the waiting area and completed the questionnaire, giving their impressions of the CTT.

To reduce scheduling problems, and because only two lanes were available for firing in the Wiesbaden CTT, participants were required to first zero their weapons and then fire both the PRF and RF tables in succession on the same day.

Testing in the CTT was carried out under strict constraints of standardization. To achieve this standardization, the same scorers were used for each lane on a daily basis. It was hoped this procedure would reduce uncontrolled scorer bias. Firers changed lanes after they completed the PRF tables. The PRF contained similar targets to the RF except that order of firing position (foxhole or prone) was changed, and the frequency of some target presentations was reduced and other presentations added. The two lanes available in the CTT limited the number of firers that could be processed simultaneously. Once inside and zeroed, firers took an average of 30 to 45 minutes to complete the program.

The initial group firing in the CTT experienced excessive malfunctions with the RFA in the beginning. The dominant malfunction was the incorrect seating of the RFA magazine into the rifle. Since it was not seated correctly, the .22 caliber round failed to chamber, causing many misfires. The failure rate decreased after soldiers had more experience in using the RFA with the M16A1 rifle. After becoming more familiar with the idiosyncrasies of this device, the test team made some significant changes in ammunition-handling procedures that further decreased the failure rate. Despite this, the number of malfunctions that occurred because of misfires substantially contributed to increasing CTT make up (alibi) time per firer. The total firing time required was successfully reduced by a decision of the test team to permit make up firing in excess of five alibis only. Although this procedure tended to reduce CTT hit probability scores, it was not expected to adversely affect any correlations obtained with these scores, since misfires and failures to feed occurred randomly.



The Wildflecken outdoor range was the standard against which CTT performance scores were compared. Because validation of the CTT for marksmanship qualification depends on obtaining a high correlation between CTT scores and scores on an outdoor range, participants were required to complete the identical qualification program at Wildflecken. However, to instill confidence in the findings and to ascertain that scores were not anomalous, a test-retest correlation of the scores at Wildflecken was required. Presumably, if the correlations at both facilities were identical, it could then be inferred that CTT scores could be used to predict marksmanship ability at Wildflecken as proficiently as Wildflecken itself. Therefore, to obtain a Wildflecken test-retest correlation all participants first zeroed their weapons and then fired the PRF tables on the first day at the outdoor range and completed the RF tables on the following day. Each participant was also randomly assigned to a different lane each day. These procedures allowed the same factors (e.g., time lapse between indoor and outdoor firings, lane advantages, scorer bias, target obscuration, etc.) to vary as they varied between firing in the CTT and at Wildflecken, except that both of these firings occurred at Wildflecken on successive days.

Personnel selected as scorers at Wildflecken were NCOs from the same companies as the firers. Scorers were assigned to the same lanes throughout the 2-day weekend scheduled at the outdoor range and did not themselves fire. To save time and to correspond with those procedures employed in the CTT, participants fired only those alibis in excess of five.

#### RESULTS AND DISCUSSION

Table 2 presents the correlations obtained in comparing CTT and Wildflecken firings.

A high correlation between the CTT and Wildflecken was impossible to achieve, because the test-retest correlation between the PRF and RF at Wildflecken was only .10 (not statistically significant). Since scores from the first day of firing at Wildflecken did not even correlate with scores made by the same firers on a subsequent day at Wildflecken, they could hardly be expected to correlate with scores from the CTT (or anywhere else).

In fact, there was no significant difference between the test-retest correlation at Wildflecken and a correlation of the crossover components of scores obtained at the two facilities (i.e., CTT PRF/Wildflecken RF, CTT RF/Wildflecken PRF). Therefore, despite an insignificant correlation, CTT scores are no worse in predicting scores at Wildflecken than Wildflecken is itself.

Table 2

Correlation Coefficient Between Firings at  
the CTT and Wildflecken

Coefficient (r) between:	r	F
CTT PRF and Wildflecken PRF	.11	NS
CTT RF and Wildflecken RF	.25	NS
CTT PRF and Wildflecken RF	.17	NS
CTT RF and Wildflecken PRF	.08	NS
CTT PRF and CTT RF	.72*	--
Wildflecken PRF and Wildflecken RF	.10	NS

Note: PRF = practice record fire.  
 RF = record fire.  
 NS = Not statistically significant.  
 \* = Significant ( $p < .001$ ).

The only correlation of significance found in this evaluation was between the PRF and RF sequence conducted in the CTT ( $r = .72$ ,  $p < .001$ ). This finding indicates that despite the problems encountered with misfires, the test-retest correlation at the CTT was highly reliable.

A major factor contributing to the unreliability at Wildflecken was that some firing lanes were more advantageous to firers than were others. For example, on the PRF tables the average score for lane 12 was 14.8 per firer (out of each 40 rounds fired), whereas lane 7 averaged 31.5 hits. During the RF sequence, lane 12 had 19.53 hits and lane 7 produced 26.36 hits. These large differences among the 7 lanes were statistically significant ( $F = 25.24$  for PRF and  $F = 21.85$  for RF,  $p < .01$ ). Further analysis revealed that over 58% of the variance on the PRF and 54% of the variance on RF was accounted for solely by firing lane differences. How much of these differences can be attributed to equipment failure, grader bias, and/or variations in vegetation growth is not known. The average scores for the two lanes at the CTT were 19.7 and 20.1 hits. These scores were not significantly different and accounted for less than 1% of the variance in scores at the CTT.

Overall, the average CTT score (for both treatment groups and firing trials combined) was 19.3 hits, whereas the average Wildflecken score was 24.0 hits. This difference, as indicated by the split plot analysis of variance shown in Table 3, was statistically significant ( $F = 38.91$ ,  $p < .01$ ).

Table 3  
Split Plot Analysis of Variance of  
Marksmanship Scores (40 shots)

Source	df	MS	F
1. Between participants	103	--	--
2. A (Groups $X_1$ and $X_2$ )	1	476.93	[2/3] <sup>a</sup> 5.94*
3. Participants within groups	102	80.28	--
4. Within participants	312	--	--
5. B (CTT and Wildflecken)	1	2318.08	[5/7] 38.91**
6. AB interaction	1	29.57	[6/7] .496 NS
7. B x participants within groups interaction	102	59.57	--
8. C (PRF and RF)	1	51.23	[8/10] 2.062 NS
9. AC interaction	1	62.49	[9/10] 2.516 NS
10. C x participants within groups interaction	102	24.84	--
11. BC interaction	1	21.25	[11/13] .955 NS
12. ABC interaction	1	40.51	[11/13] 1.82 NS
13. BC x participants within groups interaction	102	22.25	--
14. Total	415		

<sup>a</sup>[2/3] = MS of line 2 (here factor A) divided by MS of line 3 to obtain F score.

\*  $p < .05$  where  $F = .05$  for 1, 102 df = 3.94.

\*\*  $p < .01$  where  $F = .01$  for 1, 102 df = 6.93.

NS = not statistically significant.

Nevertheless, there were so many instances at Wildflecken where the men were given a hit, but were not observed by the test team to have hit a target at all, that the data collected on target hits is suspect. It is also possible that the method of scoring from or behind the firing position is not sufficiently accurate for research purposes.

Scores from treatment Groups  $X_1$  and  $X_2$  averaged 22.8 and 20.6 hits respectively, again significantly different ( $F = 5.94$ ,  $p < .05$ ). Alternatively, the difference between PRF and RF scores, 21.3 and 22.0 respectively, was insignificant ( $F = 2.062$ , NS).

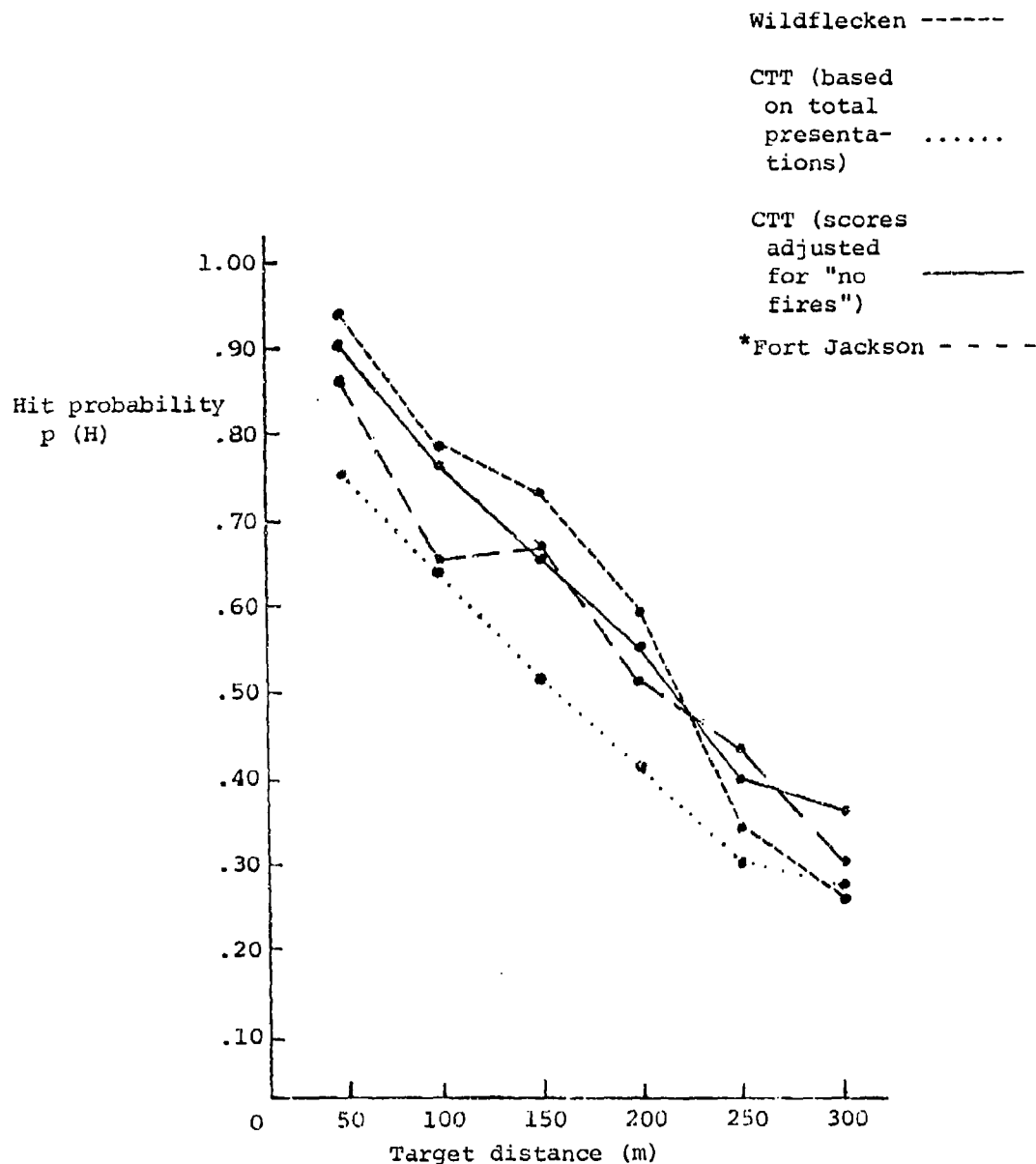
Table 4 gives the percentages of hits achieved out of the total number of presentations provided, by target range, for the CTT and Wildflecken. The table includes adjusted scores for the CTT that take into account targets actually fired upon after "no fires" have been eliminated. These adjustments were made because 20.8% of all targets presented in the CTT were not fired upon (compared with only 2.6% at Wildflecken). These targets were omitted because of problems associated with the rimfire adapter and .22 caliber insert. The adjusted scores reflect CTT performance when there are no rimfire adapter problems and eliminate the significant differences between the unadjusted scores (line 5 in Table 3).

Table 4

Overall Hit Percentages by Target District and Facility

Facility	Target distance (m)					
	50	100	150	200	250	300
CTT (based on total presentations)	75	64	52	41	31	28
CTT (scores adjusted for "no fires")	91	76	65	55	40	36
Wildflecken	93	78	73	59	34	27

Figure 3 shows the probability of hit [ $p^{(H)}$ ] for the different target ranges. The graph includes data from the CTT, Wildflecken, and another BRM study conducted at the Army Training Center at Fort Jackson, S.C. (Tierney and Cartner, 1977). The Fort Jackson curve represents hit probabilities based on the current Army Subject Schedule BRM program of instruction (77 hours and 720 rounds). The unadjusted CTT scores are lower than Fort Jackson's but generally the curves slope at the same rate. When adjusted for "no fires" and when the differences in target presentations at 50 and 100 m are taken into account, the curves more closely approximate each other. Therefore, the relative difficulty of



\*At Fort Jackson the smaller F-type (head and shoulder) targets were used at ranges of 50 and 100 m. E-type (waist-up) targets were used at ranges of 150 m and beyond. (Data points obtained from Tierney and Cartner, 1977.)

Figure 3. The probability of hit for varying target ranges obtained from qualification firing at three test facilities.

hitting targets at different distances is effectively the same in both the CTT and at Fort Jackson.

The Wildflecken curve, however, has a steeper slope than the other curves, primarily because of a sharp drop in percentage hits between 200 m (59%) and 250 m (34%). The figure suggests that firing difficulty in the CTT is at least equivalent to outdoor firing at all target distances.

Table 5 shows that the four paper-and-pencil predictor tests failed to correlate significantly with marksmanship scores at either Wildflecken or the CTT.

Table 5  
Predictor Test Results  
Correlations (r and R) Between the Predictor Tests and Scores  
at Wildflecken and the CTT

Predictor test	CTT	Wildflecken
	Record fire	Record fire
Perceptual Speed Test	r = .156	r = .052
Speed of Perception Test	r = .141	r = .169
Attention to Detail Test	r = .054	r = .151
Visual Memory Test	r = -.001	r = .074
Maximum multiple correlation achieved combining the above tests into a predictive equation	R = .177	R = .175

Note: None of the correlations was statistically significant ( $p < .05$ ).

When scores from the predictor tests were combined or taken individually, the maximum simple or multiple correlation achieved was .177 for the CTT and .175 for Wildflecken. Neither correlation was significant.

In response to question 41 of the questionnaire, 49% of the participants indicated that the outdoor range provides better combat training, and only 26% indicated preference for the CTT. The remaining 25% indicated there was no difference. Riflemen favored the Wildflecken range despite the fact that overall performance was considerably more reliable in the CTT. These attitudes about effectiveness are not supported by the particular firing performances. In fact, firer performance was much

more consistent in the CTT. Soldiers who performed well on the PRF fired consistently as well on the RF.

Soldiers were skeptical at first and did not accept the CTT as a valid means of qualification. The most common reasons for nonacceptance were the absence of realism, difficulty in setting a battlesight zero, inability to adjust the rear sight because of inadequate lighting, and inoperability of the RFA and/or the magazine loading cartridge. All these objections can be either eliminated or greatly reduced. Nevertheless, many firers recognized not only the training and skill maintenance potential but also the convenience and cost savings of the CTT.

The soldiers who fired in the CTT were a little more hesitant and unsure during the PRF exposure in the CTT than they were on the outdoor range. With practice, however, much of their hesitancy and uncertainty associated with the CTT disappeared.

General observations noted by test personnel on the CTT included the following:

- The various problems associated with the RFA and the .22 caliber magazine insert resulted in many no fires (i.e., targets not being fired upon at all). The lower scores in the CTT resulted more from these no fires than from any difficulty associated with hitting targets indoors, as evidenced by the curve adjusted for "no fires" in Figure 3.
- The CTT has the potential for providing better training feedback than outdoor range firing, because it displays the strike of the bullet on both hits and misses. Soldiers with excellent eyesight could see bullet holes in the screen. Because rear screen floodlighting was not sufficient, however, more firers had to get their hit and miss information from the scorers, who used binoculars. Although the motivating effect of seeing a target fall is missing in the CTT, such feedback, if properly implemented, should permit more effective training.

General observations noted at Wildflecken by test personnel included the following:

- A number of the M31A1 target mechanisms malfunctioned, so that only 7 of the 12 firing lanes at Wildflecken could be used.
- All lanes had something wrong with them at some time. Either the target failed to appear consistently, or it was obscured by vegetation overgrowth.
- Graders occasionally scored a hit when a target did not fall and, in some cases, even when it failed to appear.

## CONCLUSIONS AND RECOMMENDATIONS

This study supports using the CTT as an alternative training technique for maintaining marksmanship skills; however, only tentative support can be given to using the CTT for conducting annual BRM qualification. This support is based on the relatively high reliability of scores at the CTT (i.e., the .72 test-retest correlation) and on their agreement with expected target hit probabilities for given range distances. The gradual decrease in percentage hits with increasing target distance (obtained in the CTT) corresponds favorably with the rate of decrease for the outdoor BRM range at Fort Jackson (Tierney and Cartner, 1977).

The crucial test, however, is to demonstrate a high correlation between CTT scores and scores on a standard qualification range. Wild-flecken was to provide this standard range, but its scores proved unreliable. The scores at Fort Jackson were more reliable (i.e., test-retest correlations were significant and ranged from .494 to .546); yet there is no basis for correlating the Fort Jackson scores with CTT scores, because the tested riflemen and the testing conditions at the two ranges were not identical. Without this correlation, conclusions concerning the adequacy of the CTT relative to outdoor qualification must remain tentative.

By evaluating this aspect of CTT capability, a useful notion has been demonstrated. With the RFA and the target presentations described, it is possible for a commander to bring skill maintenance training and evaluation into the local training area wherever a CTT is located. Because equipment is protected from the elements in a sheltered environment and training takes place indoors, continuous day/night, year-round firing is possible. Thus, a substantial savings can be achieved in travel and billeting costs in the use of the more accessible CTT. The savings in ammunition alone could be significant. An important feature is that the opportunities for scoring errors are greatly minimized in the CTT. The CTT can also be more easily maintained and scheduled for training than a comparable outdoor facility. Given the poor relationships found within and among correlations obtained in this research, however, conclusions drawn about the CTT facilities must be regarded as tentative until additional data are available.

Based on the findings of this research, it is recommended that

1. USAREUR units should consider CTT BRM training as a viable alternative to range firing for BRM skill training and maintenance. CTT BRM training should be used to supplement range opportunities to

- Provide initial or remedial skill training;
- Provide for more frequent skill maintenance firings; and



- Substitute for range firing when cost or time constraints exist.

2. A follow-up investigation should be conducted, employing a more carefully regulated record fire range such as Hohenfels as the criterion. In this manner the intervening variables encountered in this evaluation can be more carefully controlled to establish whether rifle qualification can be validly accomplished with this technique.

3. The following suggestions should be implemented to improve this CTT simulation technique:

- Overhead lighting within the firing ranges should be sufficiently high to allow the firer to properly align his rear sights.
- The floodlighting behind the moving paper screen should be intense enough that the firer can see where each round strikes.
- When the CTT is used for training, observers/graders should provide feedback to firers on the bullet strike, and where necessary, for correction of aim.
- Second-generation color slides having greater quality control should be produced for use with this technique.
- A revised scoring system may be advisable, at least on an interim basis, until the hardware problems associated with the RFA have been worked out.

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APPENDIX A  
PRACTICE TEST

Subject No. \_\_\_\_\_

TRIAL I

No. of Rounds to Zero \_\_\_\_\_

PRACTICE RECORD FIRE

DATE	SSAN	Unit	Date	Time
------	------	------	------	------

TABLE 1. FOXHOLE POSITION

RD	Range (M)	Time (Sec)	Hit	Miss	No Fire	Miss
1	200	5				
2	150	5				
3	250	10				
4	300	10				
5	200	5				
6	150	5				
7	100	5				
8	250	10				
9	200	5				
10	150	5				
TOTAL						

TABLE 3. PRONE POSITION

RD	Range (M)	Time (Sec)	Hit	Miss	No Fire	Miss
1	50	5				
2	200	5				
3	100	5				
4	150	5				
5	300	10				
6	250	10				
7	50	5				
8	200	5				
9	150	5				
10	250	10				
TOTAL						

TABLE 2. FOXHOLE POSITION

RD	Range (M)	Time (Sec)	Hit	Miss	No Fire	Miss
1	100	15				
2	250					
3	50	15				
4	300					
5	100	10				
6	150					
7	50	20				
8	150					
9	250					
10	200	5				
TOTAL						

TABLE 4. PRONE POSITION

RD	Range (M)	Time (Sec)	Hit	Miss	No Fire	Miss
1	100	15				
2	250					
3	300	10				
4	50	10				
5	200					
6	150	15				
7	300					
8	50	10				
9	200					
10	100	5				
TOTAL						

TABLE	HIT	MISS	NO FIRE	MISS
1				
2				
3				
4				
TOTAL				

SCORER'S SIGNATURE

DATE

APPENDIX B  
QUALIFICATION TEST

**TRIAL II**  
**RECORD FIRE SCORE CARD**

LAST NAME, FIRST NAME SSAN Unit Lane Time

**TABLE 1 FOXHOLE POSITION**

RD	Range (M)	Time (Sec)	HIT	MISS	No. FIRE	ALERT
1	50	5				
2	200	5				
3	100	5				
4	150	5				
5	300	10				
6	250	10				
7	50	5				
8	200	5				
9	150	5				
10	250	10				
TOTAL						

**TABLE 2 PRONE POSITION**

RD	Range (M)	Time (Sec)	HIT	MISS	No. FIRE	ALERT
1	150	15				
2	250					
3	300	10				
4	50	10				
5	250					
6	150	15				
7	300					
8	50	10				
9	200					
10	100	5				
TOTAL						

TABLE	HIT	MISS	No. FIRE	ALERT
1				
2				
3				
4				
TOTAL				

**TABLE 3 PRONE POSITION**

RD	Range (M)	Time (Sec)	HIT	MISS	No. FIRE	ALERT
1	150	5				
2	300	10				
3	100	10				
4	200					
5	150	15				
6	250					
7	100	15				
8	300					
9	200	15				
10	300					
TOTAL						

**TABLE 4 FOXHOLE POSITION**

RD	Range (M)	Time (Sec)	HIT	MISS	No. FIRE	ALERT
1	100	10				
2	200					
3	250	20				
4	300					
5	100	15				
6	250					
7	250	10				
8	300	10				
9	50	10				
10	100					
TOTAL						

SCORER'S SIGNATURE LANE NO  
 QUALIFICATION SCORES AND RATING:  
 POSSIBLE 40  
 EXPERT 28-40  
 SHARPSHOOTER 24-27  
 MARKSMAN 17-23  
 UNQUALIFIED 16-BELOW

QUALIFICATION (CIRCLE ONE)

EXPERT, SHARPSHOOTER, MARKSMAN, UNQUALIFIED  
 FIRER'S QUALIFICATION SCORE

II-1

OFFICIAL SCORER'S SIGNATURE

APPENDIX C

EXAMPLES OF PERCEPTUAL AND MOTOR SKILL PERFORMANCE TESTS

## Perceptual Speed Test—Form 2

### DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO

Read the following directions carefully:

First fill in your name, service number, date, and installation, asked for above.

This is a test to find out how quickly you can match forms that are alike. Look at the example on this page. There are two columns of pictures. In the right column are four groups of pictures. Below each group are answer spaces with the letters A, B, C, D, and E. In the left column are five groups of pictures. Each has a letter beside it. Four of the groups in the left column are just like the four groups in the right column, and one is different. In this test, for each group of pictures in the right column, you are to find a group just like it in the left column.

Now look at the first group of pictures in the right column. Then find this group of pictures in the left column. In this example, it is the group with the letter B. Now look at the answer spaces under the first group of pictures in the right column. A heavy black mark has been made to show that group B is the same as group 1. Now go on to the next group in the right column. The group like it in the left column is lettered D, so a heavy black mark has been made below D on the right. Do the rest of the problems.

Be careful to make no marks on your answer sheet other than those you place between the dotted lines. Make heavy black marks to indicate the answer you choose. If you have to change an answer, erase it carefully and completely.

Remember that this is a test of your speed, but it is very important to work carefully because wrong answers will count against your score.

Right Column

Left Column

<p>A</p>	
<p>B</p>	
<p>C</p>	
<p>D</p>	
<p>E</p>	

As soon as you are told, tear off this first sheet carefully. Wait for the signal to begin and then do the problems in the test as you have done them in this sample. Work as fast as you can.



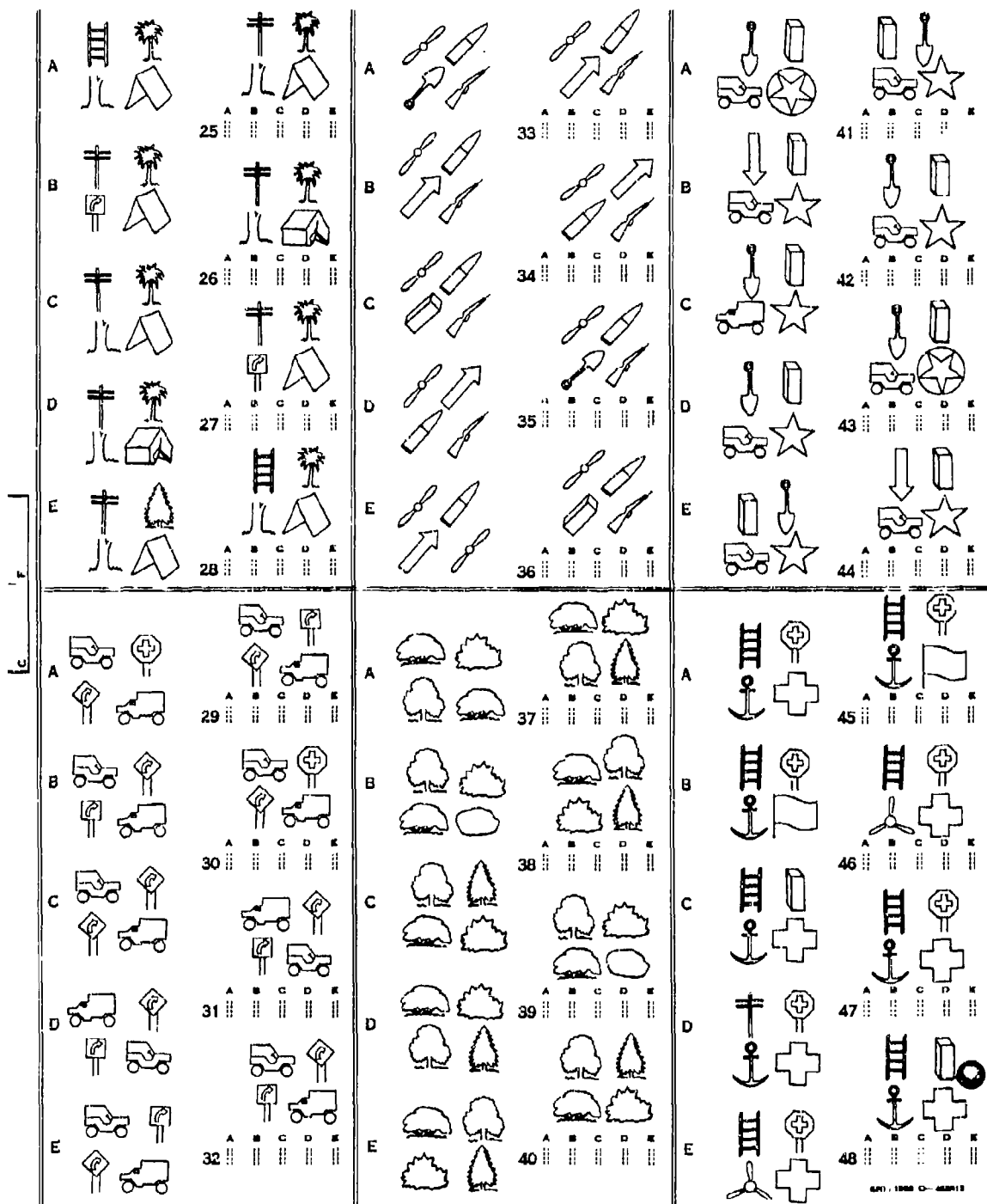
3. INSTALL. 4. DATE

<p>A</p> <p>1</p> <p>B</p> <p>2</p> <p>C</p> <p>3</p> <p>D</p> <p>4</p> <p>E</p>	<p>A</p> <p>5</p> <p>B</p> <p>6</p> <p>C</p> <p>7</p> <p>D</p> <p>8</p> <p>E</p>	<p>A</p> <p>9</p> <p>B</p> <p>10</p> <p>C</p> <p>11</p> <p>D</p> <p>12</p> <p>E</p>	<p>A</p> <p>17</p> <p>B</p> <p>18</p> <p>C</p> <p>19</p> <p>D</p> <p>20</p> <p>E</p>
<p>A</p> <p>21</p> <p>B</p> <p>22</p> <p>C</p> <p>23</p> <p>D</p> <p>24</p> <p>E</p>	<p>A</p> <p>25</p> <p>B</p> <p>26</p> <p>C</p> <p>27</p> <p>D</p> <p>28</p> <p>E</p>	<p>A</p> <p>29</p> <p>B</p> <p>30</p> <p>C</p> <p>31</p> <p>D</p> <p>32</p> <p>E</p>	<p>A</p> <p>33</p> <p>B</p> <p>34</p> <p>C</p> <p>35</p> <p>D</p> <p>36</p> <p>E</p>

PT 2644

27

TURN OVER AND GO ON



SPEED OF PERCEPTION TEST - ARL  
(After Evans)

Directions

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

On the other side of this sheet are all the numbers from 1 to 50 in mixed fashion. In the upper left hand corner is a small circle. Start at this circle and without raising your pencil draw a straight line to the number 1, from there draw a line to the number 2, then to the number 3, and so on until the signal to STOP is given.

Make your lines as straight as you can from one number to the next - directly through any numbers which lie in between. You may lift your hand from the page to look for the next number, then start from where you left off and go ahead. The line must be connected.

When you are told to stop put a heavy circle around the last number you reached.

DO NOT TURN THIS PAGE UNTIL YOU ARE GIVEN THE SIGNAL  
TO BEGIN. Write your name on this test.

Name \_\_\_\_\_

Unit \_\_\_\_\_

0  
Begin here

1 47

35

45

31

3

43

29

5

15

33

37

9

13

27

21

41

19

7

11

25

17

49

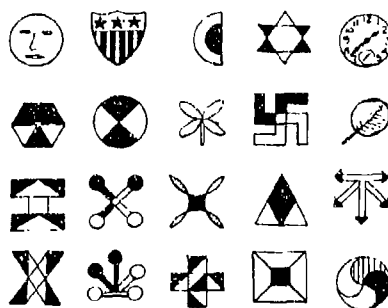
23

39

30220

VISUAL MEMORY TEST - ARL  
(Permission Dr. J.E. Evans.)

Time: 3 min.



Directions: Blacken the space on the answer sheet of the letter of the design you saw in Part I. There is only one design in each row of ten designs.

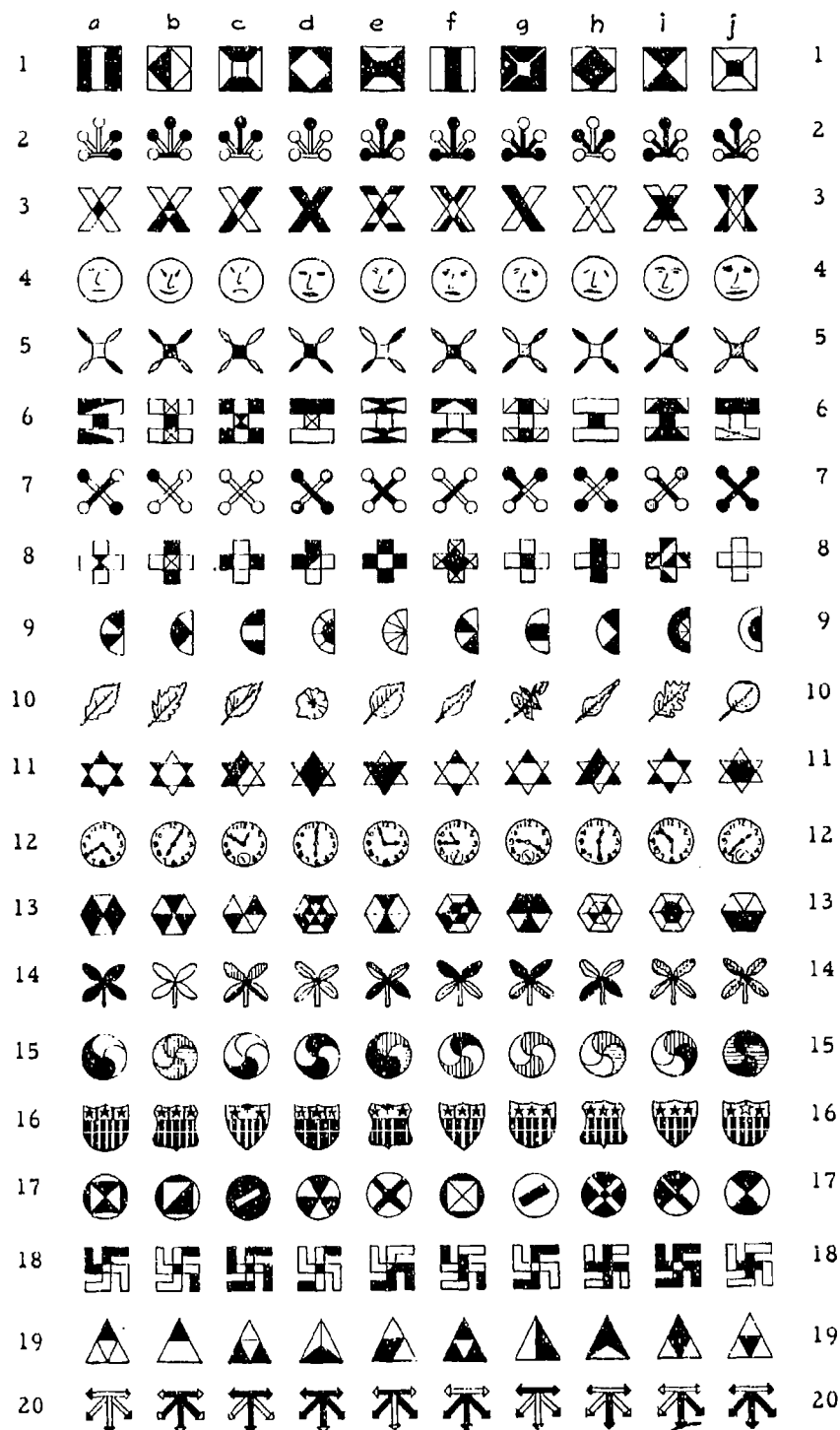
Part II is continued on the following page. DO NOT TURN YOUR PAGE UNTIL told to do so. WAIT FOR THE SIGNAL.

# VISUAL MEMORY TEST - ARL (After Evans)

Time: 2 min.

Part II

Mark answers on answer sheet.



**ARI FIELD UNIT**

PT 5216

**USAREUR**

BRM QUESTIONNAIRE

US Army Research Institute  
Field Unit, USAREUR

August 1978



## BRM Questionnaire

This questionnaire is being administered to you as part of a study conducted by the Army Research Institute to identify methods of improving Basic Rifle Marksmanship (BRM) facilities and training. Your answers will provide information on those conditions which are in need of improvement and will assist the Army in determining what actions must be taken to improve BRM training and requirements for periodic Record Fire qualification. Your honest responses are therefore essential.

We have no need to single out your responses individually. The data collected here is solely for use in evaluating current BRM training and facilities and in no way will reveal your performance scores or identity on an individual basis when compiled and described.

Most of the questions require you to check one of the answers provided. Please feel free to comment on any item on which you wish to give additional information. Write your comments legibly in the space below the question. Please give all answers careful thought and be totally honest in your replies. All individual replies will be held in strictest confidence and under no circumstances will such data be released to any Army authority.



Rifle Stock No. \_\_\_\_\_ V.A. Score: L \_\_\_\_\_ R \_\_\_\_\_ Date \_\_\_\_\_  
Name \_\_\_\_\_ Rank \_\_\_\_\_ SSAN \_\_\_\_\_ Age 20.5  
Years in Service 3.36 Primary MOS 11B Time in MOS 2.05

For each of the following questions, check one answer only.

1. What is your highest level of civilian education?

- .26 a. Did not finish High School.  
.64 b. High School Graduate.  
.10 c. Some College.  
.00 d. College Graduate.

2. How long have you been in Europe?

- .20 a. 1 to 6 months.  
.28 b. 6 months to one year.  
.47 c. 1 to 2 years.  
.05 d. More than 2 years.

3. What is the last official Record Fire rating you received?

- .52 a. Expert.  
.32 b. Sharpshooter.  
.14 c. Marksman  
.02 d. Unqualified

4. Within what time frame did you last fire for record?

- .13 a. 1 to 3 months.  
.39 b. 4 to 6 months.  
.13 c. 7 to 9 months  
.21 d. 10 to 12 months.

5. How much firing experience have you had with a .22 or higher caliber rifle, apart from your military training?

.11 a. None.  
.23 b. Very Little.  
.30 c. Some.  
.36 d. A Great Deal.

6. Have you had experience prior to this date in firing the M16 rifle with a .22 caliber inbore adapter?

.51 a. Yes. If yes, for what purpose? \_\_\_\_\_  
.44 b. No.

7. Have you had experience prior to this date in firing the M16 rifle in a Combat Training Theater?

.46 a. Yes. If yes, for what purpose? \_\_\_\_\_  
.54 b. No.

8. Do you wear corrective lenses when firing a rifle?

.23 a. Yes, glasses.  
.02 b. Yes, contact lenses.  
.75 c. No.

9. Which eye do you normally sight with when firing a rifle?

.83 a. Right eye.  
.17 b. Left eye.

10. How certain are you that you can zero the M16 Rifle, on an outdoor range, given 6 rounds?

- .28 a. Very certain.  
.40 b. Fairly certain.  
.26 c. Neither certain nor uncertain.  
.05 d. Fairly uncertain.  
.01 e. Very uncertain.

11. How certain are you that you can zero the M16 Rifle, on an indoor range, given 6 rounds?

- .13 a. Very certain  
.38 b. Fairly certain.  
.45 c. Neither certain nor uncertain.  
.02 d. Fairly uncertain.  
.02 e. Very uncertain.

12. How certain are you that you can hit each of the following stationary target silhouettes in daylight on an outdoor range, with the M16 Rifle? (Check one answer in each column only.)

Targets

50 Meters	100 Meters	150 Meters	200 Meters	250 Meters	300 Meters	
<u>.99</u> a.	<u>.83</u> a.	<u>.67</u> a.	<u>.31</u> a.	<u>.11</u> a.	<u>.05</u> a.	Very certain to hit.
<u>.03</u> b.	<u>.13</u> b.	<u>.26</u> b.	<u>.53</u> b.	<u>.73</u> b.	<u>.26</u> b.	Fairly certain to hit.
<u>.03</u> c.	<u>.04</u> c.	<u>.07</u> c.	<u>.16</u> c.	<u>.41</u> c.	<u>.52</u> c.	Might hit or miss.
<u>.00</u> d.	<u>.00</u> d.	<u>.00</u> d.	<u>.00</u> d.	<u>.04</u> d.	<u>.10</u> d.	Fairly certain to miss.
<u>.00</u> e.	<u>.00</u> e.	<u>.00</u> e.	<u>.00</u> e.	<u>.01</u> e.	<u>.07</u> e.	Very certain to miss.

13. How certain are you that you can hit each of the following stationary target silhouettes on an indoor range, with the M16 Rifle? (Check one answer in each column only.)

Targets

50 Meters	100 Meters	150 Meters	200 Meters	250 Meters	300 Meters	
<u>.75</u>	a. <u>.69</u>	a. <u>.51</u>	a. <u>.29</u>	a. <u>.11</u>	a. <u>.05</u>	a. Very certain to hit.
<u>.09</u>	b. <u>.16</u>	b. <u>.30</u>	b. <u>.39</u>	b. <u>.38</u>	b. <u>.21</u>	b. Fairly certain to hit.
<u>.15</u>	c. <u>.14</u>	c. <u>.17</u>	c. <u>.29</u>	c. <u>.46</u>	c. <u>.62</u>	c. Might hit or miss.
<u>.01</u>	d. <u>.01</u>	d. <u>.11</u>	d. <u>.03</u>	d. <u>.02</u>	d. <u>.05</u>	d. Fairly certain to miss.
<u>.00</u>	e. <u>.00</u>	e. <u>.00</u>	e. <u>.01</u>	e. <u>.03</u>	e. <u>.06</u>	e. Very certain to miss.

The following questions are directed at gaining your impressions of the Basic Rifle Marksmanship (BRM) Training you have received.

14. When did you complete BRM Training? (Year) 1976

15. My attitude toward BRM Training was that I:

- .23 a. Liked it very much.  
.39 b. Liked it.  
.31 c. Neither liked nor disliked it.  
.04 d. Disliked it.  
.03 e. Disliked it very much.

16. The technical aspects of BRM Training (i.e. those concerned with M16 basic construction, disassembly, maintenance, etc.) were:

- .50 a. Very easy to understand.  
.37 b. Easy to understand.  
.18 c. Neither easy nor difficult to understand.  
.01 d. Difficult to understand.  
.02 e. Very difficult to understand.

17. The procedures and fundamentals of rifle marksmanship (i.e. those concerned with zeroing, proper handling, correct firing positions, etc.) were:

- .36 a. Very easy to understand.
- .48 b. Easy to understand.
- .15 c. Neither easy nor difficult to understand.
- .01 d. Difficult to understand.
- .00 e. Very difficult to understand.

18. The BRM Training I received to prepare me for firing at night was:

- .10 a. Very good.
- .35 b. Good.
- .33 c. Adequate.
- .18 d. Poor.
- .04 e. Very poor.

19. The BRM training I received involved:

- .22 a. A great deal of unnecessary repetition.
- .37 b. Some unnecessary repetition.
- .34 c. The right amount of repetition.
- .07 d. Not enough repetition for me to learn.
- .00 e. Much too little repetition for me to learn.

20. The overall presentation of the BRM Training I received was:

- .30 a. Highly organized.
- .46 b. Somewhat organized.
- .14 c. Neither organized nor disorganized.
- .08 d. Somewhat disorganized.
- .03 e. Highly disorganized.

21. To satisfactorily understand the subject of BRM I found that the course presentation time provided was:

- .18 a. Much too long.
- .24 b. Fairly long.
- .51 c. About right.
- .07 d. Fairly short.
- .00 e. Much too short.

22. The NCO's and instructors responsible for my BRM training seemed to have:

- .32 a. A great deal of knowledge and skill.
- .53 b. Quite a bit of knowledge and skill.
- .12 c. Some but not much knowledge and skill.
- .01 d. Very little knowledge and skill.
- .02 e. Hardly any knowledge and skill.

23. If I have to carry out the tasks learned in BRM training I would perform them:

- .22 a. Very effectively.
- .65 b. Effectively.
- .13 c. Neither effectively nor ineffectively.
- .00 d. Ineffectively.
- .00 e. Very ineffectively.

24. I believe that the average soldier in my unit, who has gone through BRM Training, is a:

- .03 a. Very good marksman.
- .67 b. Good marksman.
- .23 c. Borderline marksman.
- .01 d. Poor marksman.
- .01 e. Very poor marksman.

25. My assigned primary MOS makes:

- .27 a. The best use of my rifle firing abilities.
- .31 b. Good use of my rifle firing abilities.
- .24 c. Some use of my rifle firing abilities.
- .08 d. Poor use of my rifle firing abilities.
- .10 e. No use at all of my rifle firing abilities.

The following questions are directed at obtaining information on how your skills in rifle marksmanship are currently being maintained. We would also like your impressions regarding the value of two differing trainfire facilities (outdoor vs. indoor), with respect to the potential that each has for sustaining those skills.

26. Have you received any individual rifle marksmanship training after BRM?

- .39 a. Yes. If yes, specify: \_\_\_\_\_
- .61 b. No.

27. Are training devices or aids of any type currently being used to maintain rifle marksmanship proficiency in your unit?

- .24 a. Yes. If yes, specify: \_\_\_\_\_
- .74 b. No.

28. How much time is dedicated to maintaining rifle marksmanship proficiency in your unit?

- .07 a. A very high amount.
- .09 b. A high amount.
- .33 c. An average amount.
- .32 d. A low amount.
- .13 e. A very low amount.

29. How adequate (sufficient) are the outdoor rifle marksmanship facilities (e.g. firing ranges) in use by your unit?

- .09 a. Very good.
- .20 b. Good.
- .34 c. Average.
- .26 d. Poor.
- .11 e. Very poor.

30. To what extent are resources (e.g. ammunition, indoor/outdoor ranges) available for maintaining rifle marksmanship proficiency in your unit?

- .03 a. Very great extent.
- .10 b. Great extent.
- .44 c. Moderate extent.
- .29 d. Little extent.
- .14 e. Very little extent.



31. What is the primary purpose for rifle marksmanship activities in your unit? (check one only)
- .10 a. Annual Familiarization.
  - .58 b. Annual Qualification.
  - 17 c. Maintenance of Skills.
  - .14 d. Improve Existing Skills.
  - .01 e. Advanced Individualized Training.
32. How useful is repeated live firing on your ability to maintain proficiency in rifle marksmanship?
- .43 a. Extremely useful.
  - .36 b. Moderately useful.
  - .17 c. Borderline.
  - .04 d. Of little use.
  - .00 e. Of no use.
33. To improve your qualification score do you think it is necessary to fire more practice rounds prior to Record Fire?
- .62 a. Yes.
  - .38 b. No.
34. If you answered yes to the above question, how many more rounds would be required?
- .11 a. Very many more.
  - .32 b. A good deal more.
  - .22 c. Slightly more.
  - .10 d. A few more.
  - .25 e. Does not apply. (Answered No in previous question)

35. Is annual qualification necessary once you've completed BRM Training?

.88 a. Yes.

.12 b. No.

36. Should the soldier who is not an infantry rifleman be required to meet the same standards of rifle marksmanship as the infantry rifleman?

.88 a. Yes.

.12 b. No.

37. Which of the following exercises are used to measure individual rifle marksmanship proficiency in your unit? (Check one or more, as applicable.)

.21 a. Known Distance Record Firing Table.

.28 b. Record Fire I.

.20 c. Record Fire II. (Move Out)

.13 d. Night Record Fire.

.13 e. Field Fire.

38. How well does your rifle marksmanship training prepare you for combat?

.17 a. Very good preparation.

.24 b. Good preparation.

.28 c. Adequate preparation.

.32 d. Poor preparation.

.09 e. Very poor preparation.

39. How well does the outdoor Record Fire range at Wildflecken (or other outdoor qualifying range) prepare you for combat?

.17 a. Very good preparation.

.20 b. Good preparation.

.34 c. Adequate preparation.

.29 d. Poor preparation.

.05 e. Very poor preparation

Your comments or criticism of the range at Wildflecken \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

40. How well does the indoor Record Fire range at the Combat Training Theater (CTT) in Wiesbaden prepare you for combat?

.16 a. Very good preparation.

.16 b. Good preparation.

.35 c. Adequate preparation.

.18 d. Poor preparation.

.15 e. Very poor preparation.

Your comments or criticisms of the CTT range \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

41. Which rifle range better prepares you for combat?

.19 a. Outdoor Range at Wildflecken!

.26 b. Indoor Range at Wiesbaden.

.25 c. No difference.

Your comments or criticisms \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

42. How much does firing in the Combat Training Theater simulate firing outdoors?

- .16 a. Very good similarity.  
.29 b. Good similarity.  
.21 c. No difference.  
.21 d. Poor similarity.  
.13 e. Very poor similarity.

43. How does sensing the bullet hole after each shot in the Combat Training Theater affect your firing.

- .21 a. Great improvement.  
.27 b. Some improvement.  
.33 c. No difference.  
.10 d. Some harm.  
.04 e. Great harm.

LIST ADDITIONAL COMMENTS ON ANY ASPECT OF BRM HERE. \_\_\_\_\_

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Thank you very much for your participation in this survey.